

REMARKS

Claims 1-3, 9-11 and 18-23 are all the claims pending in the application. Claim 9 is amended. New claim 24 is added.

Reissue Application

The Examiner has set forth at pages 3 and 4 of the Office Action his position with respect to issues involving (1) the applicability of the current USPTO position on recapture to the currently pending claims and (2) the need for a supplemental declaration.

With regard to the recapture issue, Applicants agree with the Examiner's conclusions that a recapture rejection is avoided by claims 1-3, 9-11 and 18-23. Applicants respectfully submit that new claim 24, which depends from claim 23, avoids a recapture rejection, based on the Examiner's analysis and logic presented in the Office Action with regard to parent claim 23.

With regard to the supplemental declaration, Applicants note that claims 1-3, 9-11 and 18-23 are rejected as being based upon a defective reissue declaration under 35 USC 251. The Examiner notes that an appropriate supplemental oath/declaration under 37 CFR 1.175(b)(1) will overcome the rejection. The Examiner has kindly provided sample language for such supplemental declaration that would be acceptable, and has indicated that the declaration must be submitted before the reissue application can be allowed.

Since all claims presently are rejected, Applicants will defer the submission of a supplemental declaration until all pending claims are allowed, thereby avoiding unnecessary effort on the part of the Applicants and the Examiner.

Claim Objections

Claims 9-11 are objected to under 37 CFR 1.75(a) as failing to particularly point out and distinctly claim the invention, since these claims depend from a cancelled claim. Applicants note that the previous amendment inadvertently amended claim 9 to depend from claim 12, rather than claim 18, which would be apparent from the Applicants' remarks submitted with the Amendment. This typographical error has been corrected.

Claim Rejections - 35 USC 103

Claims 1-3 are rejected under 35 USC 103(a) as being unpatentable over Kim (US 5,402,244 A) and Kaneko et al (US 4,908,862 A), and further in view of Okazaki et al (US 5,982,437 A). This rejection, as set forth in paragraph 8 of the Office Action, is traversed for at least the following reasons.

Kim

The Examiner initially presents an analysis of *Kim* with respect to the invention of claim 1. Notwithstanding the use of plural tables in the VLC coder 12, particularly the 4 VLC tables (61-64) in the variable length coding unit 43 as illustrated in Fig. 4, one of which is selected based on Qp magnitude, the Examiner correctly concludes that *Kim* does not teach:

A: A plurality of variable-length coding tables having different patterns of a regular region and an escape region; and

B: selecting one of the plurality of tables according to inter/intra mode information of the currently processed block; and

C: selecting one of the plurality of tables according to zigzag scanning position.

The Examiner's own characterization of the disclosure of the table-based conversion in *Kim* (see col. 5, lines 19-58) precludes any conclusion that *Kim* discloses plural frequency-based tables, and the selection of one of those tables on the basis of plural distinct factors. Specifically, *Kim*'s tables 61-64 do not contain different patterns that are defined by a combination factors, including a regular region and an escape region according to intra/inter mode information of the currently processed block. Also, *Kim*'s tables are not selected on the basis of a combination of three factors, particularly (1) intra/inter mode information of the currently processed block, (2) zigzag scanning position and (3) quantization step size, as recited in the claimed invention. The only basis for selection of a table is the magnitude of the quantization parameter Qp (col. 5, lines 23-25)

Kaneko et al

The Examiner looks to *Kaneko et al* for a disclosure in Figs. 10 and 13 of a variable length image coding system having a plurality of variable length coding tables (45). The Examiner asserts that the tables in Fig. 12 have different patterns for regular regions that represent low frequency coefficients, and escape regions that represent high frequency coefficients. The Examiner points to the discussion in *Kaneko et al* of the density of the distribution of quantized signals based on frequency and the encoding of such signals according to different code sets at col. 12, lines 1-12. Notably, the Examiner does not assert that *Kaneko et al* discloses tables that are formed on the basis of "regular region and an escape region according to intra/inter mode information," as claimed. Indeed, since the Examiner must look to *Okazaki et al* for any intra/inter mode disclosure, the feature of the claimed tables is not found in *Kaneko et al*.

Moreover, the Examiner does not assert that one of the tables is selected according to a combination of three factors ,including(1) inter/intra mode information, (2) zig zag scanning and (3) quantization step size, as claimed. The Examiner does assert that Kaneko et al selects one of a plurality of tables according to zigzag scanning position as depicted in Figs. 11 and 12. Specifically, as zigzag scanning occurs in Fig. 11, different zones of Fig. 12 are traversed and different tables are selected. However, the other two bases for selection are not disclosed.

Indeed, the selection of tables 46-50 is made by switch 55 successively and in response to the code set indication signal NM output by circuit 53 in response to an address signal (ADD). As explained at col. 12, lines 38-58, the relations between the quantized signals and the code patterns are different in the five code sets, but there is no disclosure that the selection is based on different quantization step size. In particular, the disclosure in Kaneko et al suggests that the five code sets are distinguished on the basis of the frequency categories 1-5, that correspond to the coefficients, as illustrated in Figs. 11 and 12.

Thus, even if the Examiner's assertion is correct with respect to the correspondence of high and low frequency components in the tables to regular and escape regions, respectively, other elements of the claim are missing.

However, Applicants respectfully submit that the Examiner's assertion with respect to the content of the tables is incorrect, as *Kaneko et al* does not disclose or suggest "a plurality of variable-length coding tables having different patterns of a regular region and an escape region." Rather, with reference to FIGS. 10 and 12 of the patent, *Kaneko et al* appears to disclose a VLC 56 which selects a code set/table according to a quantized signal QS. That is, it appears that a particular code set/table (i.e., one of code sets 46 through 50 of FIG. 10) is selected for a

particular quantized signal (i.e., code set number 1 through 5 in FIG. 12), so that low and high frequency components are encoded in accordance with different code sets/tables. (See column 12, lines 12-37.)

As noted by the Examiner, *Kaneko* discloses that “quantized signals for the low and high frequency components are preferably encoded in accordance with different code sets,” (column 12, line 12). This means that, for example, one code set/table 46 is used for a quantized signal 1, that is, low frequency component, while another code set/table 50 is used for a quantized signal 5, that is, high frequency component. However, *Kaneko* does not disclose or suggest that, for example, a code set/table 46 and a code set/table 50 have “different patterns of a regular region and an escape region.”

In sum, the Examiner’s reliance on *Kaneko et al* is flawed for several reasons. First, the Examiner admits that deficiency B in *Kim* is still not remedied by *Kaneko et al*. Second, Applicants respectfully submit that the Examiner also must admit that *Kaneko et al* does not teach selecting tables on the basis of a combination of factors, two of which are inter/intra mode information and quantization step size. Third, the Examiner also must admit that *Kaneko* does not form its tables on the basis of a regular region and an escape region according to intra/inter mode information of the currently processed block, as claimed. Finally, the Examiner must admit that the Examiner’s position with respect to the teachings of different patterns of a regular region and an escape region is incorrect.

Okazaki et al

The Examiner looks to *Okazaki* for a teaching of variable length coding of an image signal, where there are a plurality of VLC tables, including a table selectable for intra mode (23C in Figs. 5 and 14) and a table selectable for inter mode (23D in Figs. 5 and 12), with one table

being selectable according to inter/intra mode information of a currently processed block (Fig. 5, S3). *Okazaki et al* appears to disclose using a variable quantizing step size for quantizing, selected for each sample, and directing it to a VLC circuit or a decoding operation using the quantizing step size (col. 7, lines 10-19), but *Okazaki et al* does not segregate its tables according to quantizing step size. Thus, in selecting the inter mode and intra mode tables, quantizing step size is not considered.

Thus, *Okazaki et al* does not teach that one of the tables is selected according to a combination of three factors ,including(1) inter/intra mode information, (2) zig zag scanning and (3) quantization step size, as claimed.

The Examiner asserts that it would have been obvious to modify the VLC encoder of *Kim* (selects tables on the basis of quantization step size) in view of *Kaneko et al* (selects tables on the basis of frequency), to include different inter/intra mode tables as taught by *Okazaki et al* (selects tables on the basis of inter/intra mode) in order to improve coding efficiency. The alleged motivation is so that bit length of transformed and outputted data can be decreased, with reference to the text at col. 8, lines 1-10 and col. 10, lines 58-65 of *Okazaki*.

No Prima Facie Case for Obviousness

Applicants respectfully submit that the Examiner has not made a *prima facie* case for obviousness for several reasons related to misunderstanding of the references and to the alleged motivation to combine.

First, it must be recognized that the claims contain limitations, for example, one related to the content of the plurality of tables and the other related to the selection of one of the plurality of tables. As to table content, the claim requires that it be “different patterns of a regular region

and an escape region according to statistical characteristics of said run, level data” and that such different patterns be “according to said intra/inter mode information of the currently processed block.” The selecting step requires the selection be “according to intra/inter mode information of the currently processed block, zigzag scanning position and quantization step size.”

None of the references teaches such table content, and the Examiner’s position as to the existence of different patterns of a regular region and an escape region in *Kaneko et al* is incorrect. None of the references teaches the use of the three table selecting criteria, which alone is a basis for patentability. And certainly, none of the references teaches the combination of table content and selecting criteria, as admitted by the Examiner. Indeed, it is the combination of the table content and selecting criteria that permits the high accuracy, speed and efficiency achieved by the present invention.

Since the foregoing clearly demonstrates that the Examiner has misinterpreted one of the references and, thus, has not established a *prima facie* case for obviousness, the rejection is overcome. For the sake of economy, Applicant need not address the Examiner’s understanding of *Kim* and *Okazaki et al.*

Finally, Applicants respectfully submit that, contrary to the Examiner’s opinion and at least on the basis of the misunderstanding of the Examiner with respect to *Kaneko et al*, there is neither a motivation to combine, nor reasonable expectation of success in the references themselves. None of the references recognized the complexity of the problem first identified by the Applicants that called for the unique group of steps as now claimed, where a particular table content and selection criterion are used to achieve performance advantages. Indeed, it appears

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that each of the references discloses at least one alternative method of improving coding efficiency, thus evidencing a desire for some improvement. Significantly, none suggests incorporating the method of the other two references, or modifying its method to incorporate another's method. It is the Applicants who first disclosed the claimed subject matter as understood by the Examiner. For the Examiner to reconstruct the invention from bits and pieces of individual, alternative and incompatible teachings of the prior art, an improper use of hindsight would be involved. Accordingly, the rejection should be overcome.

Claims 18, 19 and 23 are rejected under 35 USC 103(a) as being unpatentable over Kato (US 5,559,557 A) in view of Okazaki et al (US 5,982,437 A). This rejection, as set forth in paragraph 9 of the Office Action, is traversed for at least the following reasons.

The subject matter of these claims includes a definition of the content of a plurality of tables and the criteria for selecting one of the tables. As to the content of the claimed tables, the claims specify that there is a table selectable for an AC component of an intra mode that is different from a table that is selectable for an inter mode and a table selected for a DC component of the intra mode. As to the criteria for selecting one of the plurality of tables, claim 18 specifies that the selecting is according to intra/inter mode information, scanning position and quantization step size. Claim 23 provides for a selection at least according to intra/inter mode information and a scanning position, but further provides that the table for the DC component comprising variable-length codes is further selectable according to said DC component that has been quantized by a quantization step size. Dependent claims 9 and 20 each specify that tables in claims 18 and 19, respectively, have different patterns of a regular region and an escape region.

Applicants respectfully submit that *Kato* fails to disclose or suggest at least “a table selectable for an AC component of an intra mode that is different from a table selectable for an inter mode,” as recited in claims 18, 19 and 23. Moreover, *Kato* does not teach the specifically recited tables and criteria for selecting variable length codes, as now recited in claim 23. Finally, *Okazaki et al* does not remedy the deficiency of *Kato*, as described previously. Indeed, *Okazaki* in combination with *Kato* do not disclose or suggest “a table selectable for an alternating-current (AC) component of an intra mode that is different from a table selectable for an inter mode, and a table selectable for a direct-current (DC) component of said intra mode.” In short, the Examiner has not made a *prima facie* case for obviousness on the basis of these two references.

With reference to FIG. 17 of *Kato*, as previously acknowledged by the Examiner, *Kato* only discloses a single table selectable for both an AC component of an intra mode and an inter mode.

Okazaki appears to disclose a single table for an intra mode, that is, a table for both AC and DC components of the intra mode, and a single table selectable for an inter mode. In particular, with reference to FIG. 5 of *Okazaki*, *Okazaki* appears to disclose a table selectable for an intra mode, that is, a table for both AC and DC components of the intra mode, and a table selectable for an inter mode. There is no teaching or suggestion that there should be a separate table for DC components.

Thus, even if combined, these references still do not disclose “a table selectable for an alternating-current (AC) component of an intra mode that is different from a table selectable for an inter mode, and a table selectable for a direct-current (DC) component of said intra mode.”

Furthermore, Examiner has not established how one reference should be modified through teaching of the other to arrive at Applicant's claimed invention. For example, why and how would a table for both an AC component of an intra mode and an inter mode of *Kato*, or a table for both an AC component and DC component of an intra mode of *Okazaki* be modified so as to provide (1) a table selectable for an AC component of an intra mode, (2) a table selectable for a DC component of the intra mode, and (3) a table selectable for an inter mode, as claimed. Indeed, if *Kato* is applied to *Okazaki*, *Kato* in turn separates the AC component of the intra mode from the DC component of the intra mode, but does so by providing a table for the DC component of the intra mode while directing the AC component of the intra mode to use the same table that is used for the inter mode. The combination still does not disclose or suggest a table for the AC component of the intra mode that is different from the table for the inter mode.

For at least the reasons stated above, the Examiner has not established a *prima facie* case for obviousness. Moreover, even though Applicant has not agreed to or contradicted Examiner's understanding of *Kato*, Applicant wishes to incorporate prior arguments detailing certain misinterpretations of *Kato* that have been taken by the Examiner.

Finally, Applicants respectfully submit that neither motivation to combine, as suggested by the Examiner, nor reasonable expectation of success, is found in the references themselves. In particular, each of the references discloses an alternative method of improving coding efficiency. Furthermore, these references also appear to teach away from each other, thus teaching away from a combination and/or modification. That is, while *Kato* discloses using the same table for at least a portion of intra mode and an inter mode, *Okazaki* teaches using a

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separate table for an intra mode and an inter mode. Again, it is the Applicant who has disclosed the claimed subject matter as understood by the Examiner.

Claims 20 and 21 are rejected under 35 USC 103(a) as being unpatentable over Kato (US 5,559,557 A) and Okazaki et al (US 5,982,437 A), and further in view of Kaneko et al (US 4,908,862 A). This rejection, as set forth in paragraph 10 of the Office Action, is traversed for at least the following reasons.

First, the claims depend from claim 19 and would be patentable over the combination of *Kato* and *Okazaki et al* for the same reasons. Second, *Kaneko et al* does not remedy the fundamental deficiencies of *Kato* and *Okazaki et al*, taken alone or in combination.

Applicants already have demonstrated that *Kaneko et al* merely discloses the selection of one of plural tables 46-50, each having a code set based upon frequency, using a second “conversion” table 12 that correlates the an addressed location to a particular table. Nothing in this disclosure teaches or suggests a modification of *Kato* and *Okazaki et al* to arrive at the claimed invention in any of claims 19-21.

Moreover, nothing in *Kaneko et al* teaches the use of “different patterns of a regular region and an escape region,” as claimed. Also, nothing in *Kaneko et al* teaches that a variable-length coding table is selected “in accordance with scanning position and quantization step size within the range determined in accordance with said intra/inter mode information,” as claimed.

Claim 22 is rejected under 35 USC 103(a) as being unpatentable over Kato (US 5,559,557 A), Okazaki et al (US 5,982,437 A), and Kaneko et al (US 4,908,862 A), and further in view of Jung (UK 2 267 410 A). This rejection, as set forth in paragraph 11 of the Office Action, is traversed for at least the following reasons.

First, the claims depend from claim 19 and would be patentable over the combination of *Kato* and *Okazaki et al* for the same reasons. Second, *Jung* does not remedy the fundamental deficiencies of *Kato*, *Kaneko et al* and *Okazaki et al*, taken alone or in combination.

Jung is cited for a teaching of a conversion of data in an escape region into data having variable run length and level length, in order to reduce the number of bits. The reference is not cited for any other reason, and the claim should be patentable for the reasons already given with respect to the three other references.

Claims 18, 19 and 23 are rejected under 35 USC 103(a) as being unpatentable over Kato (US 5,559,557 A) and Okazaki et al (US 5,982,437 A), and further in view of Kim (US 5,402,244 A). This rejection, as set forth in paragraph 12 of the Office Action, is traversed for at least the following reasons.

As already noted with respect to the previous rejection of these same claims on the basis of only *Kato* and *Okazaki et al* (paragraph 9), their subject matter includes a definition of the content of a plurality of tables and the criteria for selecting one of the tables. As already demonstrated, the subject matter of these claims is not taught by the two references alone or in combination. Moreover, it is noted that the Examiner has simply added *Kim* to the previous rejection, thereby demonstrating that the Examiner appears to conclude that the earlier rejection is deficient.

Applicants respectfully submit that the Examiner has not made a *prima facie* case for obviousness because *Kim* does not supplement the element missing from a combination of *Okazaki et al* and *Kato*, or otherwise remedy their clear deficiencies. *Kim* already has been discussed with respect to the rejection of claims 1-3 and its shortcomings have been highlighted.

Kim merely teaches a quantization step-based selection among conversion tables, but does not teach or even suggest the full scope of the table content or selection criteria, as claimed. As to the present claims, *Kim* as combined with *Okazaki* and *Kato* still do not disclose or suggest “a table selectable for an alternating-current (AC) component of an intra mode that is different from a table selectable for an inter mode, and a table selectable for a direct-current (DC) component of said intra mode.” There is no teaching or suggestion of different tables for AC and DC components, as is clear from the examples at col. 5, lines 19-58.

Claims 20 and 21 are rejected under 35 USC 103(a) as being unpatentable over Kato (US 5,559,557 A), Okazaki et al (US 5,982,437 A) and Kim (US 5,402,244 A) further in view of Kaneko et al (US 4,908,862 A). This rejection, as set forth in paragraph 13 of the Office Action, is traversed for at least the following reasons.

First, it is noted that the Examiner has simply added *Kim* to the previous rejection (paragraph 10), thereby demonstrating that the Examiner appears to conclude that the earlier rejection is deficient. Second, *Kim* clearly does not remedy the deficiencies of the rejection of the parent claims, as demonstrated above. Thus, these claims should be patentable for reasons already given.

Claim 22 is rejected under 35 USC 103(a) as being unpatentable over Kato (US 5,559,557 A), Okazaki et al (US 5,982,437 A), Kim (US 5,402,244 A) and Kaneko et al (US 4,908,862 A), and further in view of Jung (UK 2 267 410 A). This rejection, as set forth in paragraph 14 of the Office Action, is traversed for at least the following reasons.

Again, it is noted that the Examiner has simply added *Kim* to the previous rejection (paragraph 11), thereby demonstrating that the Examiner appears to conclude that the earlier

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rejection is deficient. Further, the claim should be patentable for the reasons given with respect to the parent claims.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

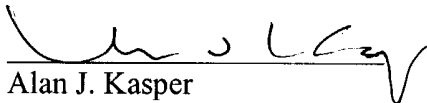
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Date: November 17, 2004